REMARKS

This paper is responsive to the Final Office Action dated August 22, 2005. Claims 1-31 were examined. Claims 1-10 are allowed. Claims 11-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,774,849 to Benyassine, et al. in view of U.S. Patent No. 4,689,760 to Lee, et al.

Allowable Subject Matter

Applicants appreciate the allowance of claims 1-10.

Claim Rejections - 35 U.S.C. § 103

Claims 11-31 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,774,849 to Benyassine, et al. in view of U.S. Patent No. 4,689,760 to Lee, et al.

Regarding claim 11, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

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a threshold determiner coupled to receive at least the
energy signal from the transform determiner and which
outputs at least an energy threshold for each frame
portion based at least in part on a value of the
energy signal during a previous frame portion,
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as required by claim 11. The Office Action relies on blocks 230, 235, and 240 of Fig. 2, and col. 3, lines 34-50 of Benyassine to supply this teaching. These portions of Benyassine teach "using multi-boundary decision regions in the space of the four difference measures" (col. 3, lines 35-36). Although Benyassine teaches parameters that are determined by differences between current frame parameters and running averages of the background noise characteristics (col. 3, lines 25-27), they are not thresholds as claimed. Benyassine teaches "keeping running averages of difference measures of said at least 2 parameters in said selective combination according to a set of predetermined thresholds" (col. 8, lines 44-46). Thus, Benyassine distinguishes the running averages of difference measures from predetermined thresholds used to generate the running averages of difference measures.

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response to 8-22-05 fos doc　　　　　　　　　　　　　　　　　　　　　　　　　　Application No.: 10/805,917

PAGE 5/16 * RCVD AT 10/24/2005 11:59:32 AM [Eastern Daylight Time] * SVR:USPTO-EFXRF-6/25 * DNIS:2738300 * CSID:512 338 6301 * DURATION (mm-ss):06-20

The Office Action states that Benyassine inherently teaches a "part of a value." Claim 11 requires a threshold determiner coupled to receive at least the energy signal from the transform determiner and which outputs at least <u>an energy threshold for each frame portion based at least in part on a value of the energy signal during a previous frame portion,</u> which is not taught either expressly or inherently by Benyassine. While a teaching may be express or inherent, inherency is a stringent standard.

> To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 U.S.P.Q.2D (BNA) 1746, 1749 (Fed. Cir. 1991). "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." Id. at 1269, 20 U.S.P.Q.2D (BNA) at 1749 (quoting *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981).

See *In re Robertson*, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999); MPEP § 2112. Applicants disagree that it is inherent for the system of Benyassine to practice the claim, specifically, a threshold determiner coupled to receive at least the energy signal from the transform determiner and which outputs at least <u>an energy threshold for each frame portion based at least in part on a value of the energy signal during a previous frame portion.</u> To be inherent in teaching a threshold determiner coupled to receive at least the energy signal from the transform determiner and which outputs at least an energy threshold for each frame portion based at least in part on a value of the energy signal during a previous frame portion, those functions must by necessity be performed in Benyassine. They are not. Indeed, Benyassine teaches a set of <u>predetermined</u> thresholds (col. 8, lines 44-46; col. 10, lines 18-21) and a <u>predetermined</u> decision region to which the difference parameters are compared (col. 5, lines 51-55). Since the thresholds of Benyassine are predetermined, a threshold determiner coupled to receive at least the energy signal from the transform determiner and which outputs at least <u>an energy threshold for each frame portion based at least in part on a value of the energy signal during a previous frame portion</u> cannot be said to "necessarily follow" from that which is disclosed by Benyassine. Not only does Benyassine fail to teach it inherently, Benyassine teaches <u>predetermined</u> thresholds.

In addition, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

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a signal processor coupled to receive at least the

energy threshold, the noise indicator, and the energy

signal and which outputs at least a signal indicating

when the input signal includes the at least <u>one tone</u>

<u>having a known frequency and duration</u>, based at least

in part on the energy threshold, the noise indicator

and the energy signal,

as required by claim 11. The Office Action apparently relies on the voice activity detection

process taught at col. 3, line 7 - col. 7, line 15. This portion of Benyassine teaches a method for

"generating frame voicing decisions for an incoming speech signal having periods of active

voice and non-active voice for a speech encoder in a speech communications system" (see col. 2,

lines 23-26). The method of Benyassine defines a four-dimensional Euclidean space and

determines whether the four difference parameters, computed for each frame, define a point

<u>within an active voice region</u> of the Euclidean space (col. 5, line 48- col. 6, line 20). Since

Benyassine teaches <u>detecting voice, not tones having known frequencies and durations,</u> the

Office Action relies on Lee to supply this teaching.

Lee teaches that the DTMF encoding technique uses four low band frequencies and four

high band frequencies (col. 1, lines 17-22). At col. 4, lines 54-66, Lee teaches applying three

criteria for validating a received sample as a DTMF tone:

1. <u>Accept only signals with exactly two of the expected 8 frequencies,</u> one in each
    group. Both tone signals must be nearly the same in amplitude and within the range of
    the expected signal strength.
2. <u>Reject signals</u> which are accompanied by significant energy <u>at frequencies other than</u>
    <u>the predetermined DTMF frequencies.</u>
3. <u>Accept only signals that satisfy the specification minimum timing requirements</u> such
    as minimum tone duration and minimum interdigit pauses

(emphasis added). Lee detects DTMF signals using a combination of frequency domain analysis

and time domain analysis and <u>rejects all signals other than</u> those signals with <u>DTMF frequencies</u>

satisfying particular timing requirements.

Assuming arguendo that the difference parameters of Benyassine are similar to the

energy threshold, the noise indicator, and the energy signal recited in claim 11, there is no

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teaching or suggestion to modify the difference parameters of Benyassine to perform the DTMF detection of Lee. The Office Action fails to point out how to modify the difference parameters of Benyassine to reject signals at frequencies other than DTMF frequencies. The difference parameters of Benyassine are computed in the time domain, whereas Lee requires determining two of the three above criteria in the frequency domain. The Office Action and the references fail to teach or suggest how to map Benyassine's parameters into the frequency domain, or otherwise combine the voice activity detection system of Benyassine with the DTMF detection system of Lee to teach the limitations of claim 11.

The Office Action states that Lee is relied on for the multiple frequency detection and that this portion of Lee is being "incorporated as a whole into the Benyassine reference." The Office Action states further that Benyassine is relied upon for the concept of using spectral energy information and Lee is relied upon for the detailed calculation using energy information. However,

> [t]he proposed modification cannot render the prior art unsatisfactory for its
> intended purpose. If proposed modification would render the prior art invention
> being modified unsatisfactory for its intended purpose, then there is no suggestion
> or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900,
> 221 USPQ 1125 (Fed. Cir. 1984).

See MPEP § 2143.01. Incorporating the DTMF detection of Lee into the voice activity detection system of Benyassine renders the system of Benyassine unsatisfactory for its intended purpose. For example, Lee teaches a system that avoids "false validation of tone signals resulting from the occurrence of coincidental speech or other signals at the DTMF frequencies" (col. 4, lines 23-26). The system of Lee rejects signals that include significant energy at frequencies other than the predetermined DTMF frequencies (col. 4, lines 61-63). The difference parameters of Benyassine are used to detect speech by determining if, for each frame, a vector defined by these parameters lies within an active-voice region. Modification of Benyassine to reject signals that include significant energy at frequencies other than the predetermined DTMF frequencies, as required by Lee, requires Benyassine to reject voice band signals that include significant energy at frequencies other than the predetermined DTMF frequencies. Such a combination renders Benyassine unsatisfactory for its intended purpose of detecting voice activity in general. Therefore, there is no suggestion or motivation to make the proposed modification and the

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teachings of Benayssine and Lee are not sufficient to render claim 11 *prima facie* obvious. Accordingly, Applicant respectfully requests that the rejection of claim 11 and all claims dependent thereon be withdrawn.

Regarding claim 22, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame,

as required by claim 22. The Office Action relies on blocks 230, 235, and 240 of Fig. 2, and col. 3, lines 34-50 of Benyassine to supply this teaching. These portions of Benyassine teach "using multi-boundary decision regions in the space of the four difference measures" (col. 3, lines 35-36). Although Benyassine teaches parameters that are determined by differences between current frame parameters and running averages of the background noise characteristics (col. 3, lines 25-27), they are not energy threshold detection values as claimed. Benyassine teaches "keeping running averages of difference measures of said at least 2 parameters in said selective combination according to a set of predetermined thresholds" (col. 8, lines 44-46). Thus, Benyassine distinguishes the running averages of difference measures from predetermined thresholds used to generate the running averages of difference measures.

The Office Action states that Benyassine inherently teaches a "part of a value." Claim 22 requires generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame, which is not taught either expressly or inherently by Benyassine. While a teaching may be express or inherent, inherency is a stringent standard. See *In re Robertson*, 49 USPQ2d 1949, 1950-51

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(Fed. Cir. 1999); MPEP § 2112. Applicants disagree that it is inherent for the system of Benyassine to practice the claim, specifically, generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame. To be inherent in teaching generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame, those functions must by necessity be performed in Benyassine. They are not. Indeed, Benyassine teaches a set of predetermined thresholds (col. 8, lines 44-46; col. 10, lines 18-21) and a predetermined decision region to which the difference parameters are compared (col. 5, lines 51-55). Since the thresholds of Benyassine are predetermined, generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame cannot be said to "necessarily follow" from that which is disclosed by Benyassine. Not only does Benyassine fail to teach it inherently, Benyassine teaches predetermined thresholds.

In addition, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> detecting, based at least in part on the energy
> threshold detection value, at least a first tone in
> the input signal including a plurality of tones, the
> first tone having a predetermined frequency and
> predetermined duration,

as required by claim 22. The Office Action apparently relies on the voice activity detection process taught at col. 3, line 7 - col. 7, line 15. This portion of Benyassine teaches a method for

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"generating frame voicing decisions for an incoming speech signal having periods of active voice and non-active voice for a speech encoder in a speech communications system" (see col. 2, lines 23-26). The method of Benyassine defines a four-dimensional Euclidean space and determines whether the four difference parameters, computed for each frame, define a point within an active voice region of the Euclidean space (col. 5, line 48- col. 6, line 20). Since Benyassine teaches detecting voice, not tones having known frequencies and durations, the Office Action relies on Lee to supply this teaching.

Lee teaches that the DTMF encoding technique uses four low band frequencies and four high band frequencies (col. 1, lines 17-22). At col. 4, lines 54-66, Lee teaches applying three criteria for validating a received sample as a DTMF tone:

   4. Accept only signals with exactly two of the expected 8 frequencies, one in each group. Both tone signals must be nearly the same in amplitude and within the range of the expected signal strength.
   5. Reject signals which are accompanied by significant energy at frequencies other than the predetermined DTMF frequencies.
   6. Accept only signals that satisfy the specification minimum timing requirements such as minimum tone duration and minimum interdigit pauses

(emphasis added). Lee detects DTMF signals using a combination of frequency domain analysis and time domain analysis and rejects all signals other than those signals with DTMF frequencies satisfying particular timing requirements.

Assuming arguendo that the difference parameters of Benyassine are similar to the energy threshold detection value recited in claim 22, there is no teaching or suggestion to modify the difference parameters of Benyassine to perform the DTMF detection of Lee. The Office Action fails to point out how to modify the difference parameters of Benyassine to reject signals at frequencies other than DTMF frequencies. The difference parameters of Benyassine are computed in the time domain, whereas Lee requires determining two of the three above criteria in the frequency domain. The Office Action and the references fail to teach or suggest how to map Benyassine's parameters into the frequency domain, or otherwise combine the voice activity detection system of Benyassine with the DTMF detection system of Lee to teach the limitations of claim 22.

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The Office Action states that Lee is relied on for the multiple frequency detection and that this portion of Lee is being "incorporated as a whole into the Benyassine reference." The Office Action states further that Benyassine is relied upon for the concept of using spectral energy information and Lee is relied upon for the detailed calculation using energy information. However, incorporating the DTMF detection of Lee into the voice activity detection system of Benyassine renders the system of Benyassine unsatisfactory for its intended purpose. See MPEP § 2143.01. For example, Lee teaches a system that avoids "false validation of tone signals resulting from the occurrence of coincidental speech or other signals at the DTMF frequencies" (col. 4, lines 23-26). The system of Lee rejects signals that include significant energy at frequencies other than the predetermined DTMF frequencies (col. 4, lines 61-63). The difference parameters of Benyassine are used to detect speech by determining if, for each frame, a vector defined by these parameters lies within an <u>active-voice region</u>. Modification of Benyassine to reject signals that include significant energy at frequencies other than the predetermined DTMF frequencies, as required by Lee, requires Benyassine to reject voice band signals that include significant energy at frequencies other than the predetermined DTMF frequencies. Such a combination renders Benyassine unsatisfactory for its intended purpose of detecting voice activity in general. Therefore, there is no suggestion or motivation to make the proposed modification and the teachings of Benayssine and Lee are not sufficient to render claim 22 *prima facie* obvious. Accordingly, Applicant respectfully requests that the rejection of claim 22 and all claims dependent thereon be withdrawn.

Regarding claim 31, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> means for generating an energy threshold detection
> value for an individual frame of a plurality of frames
> of an input signal based at least in part on the
> comparison of an energy value for the individual frame
> to an energy value of a corresponding previous frame,
> a noise component of the individual frame, and
> occurrence of energy dropout in a corresponding
> preceding frame,

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as required by claim 31. The Office Action relies on blocks 230, 235, and 240 of Fig. 2, and col. 3, lines 34-50 of Benyassine to supply this teaching. These portions of Benyassine teach "using multi-boundary decision regions in the space of the four difference measures" (col. 3, lines 35-36). Although Benyassine teaches parameters that are determined by differences between current frame parameters and running averages of the background noise characteristics (col. 3, lines 25-27), they are not energy threshold detection values as claimed. Benyassine teaches "keeping running averages of difference measures of said at least 2 parameters in said selective combination according to a set of predetermined thresholds" (col. 8, lines 44-46). Thus, Benyassine distinguishes the running averages of difference measures from predetermined thresholds used to generate the running averages of difference measures.

The Office Action states that Benyassine inherently teaches a "part of a value." Claim 31 requires generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame, which is not taught either expressly or inherently by Benyassine. While a teaching may be express or inherent, inherency is a stringent standard. See In re Robertson, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999); MPEP § 2112. Applicants disagree that it is inherent for the system of Benyassine to practice the claim, specifically, generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame. To be inherent in teaching generating an energy threshold detection value for an individual frame of a plurality of frames of an input signal based at least in part on the comparison of an energy value for the individual frame to an energy value of a corresponding previous frame, a noise component of the individual frame, and occurrence of energy dropout in a corresponding preceding frame, those functions must by necessity be performed in Benyassine. They are not. Indeed, Benyassine teaches a set of predetermined thresholds (col. 8, lines 44-46; col. 10, lines 18-21) and a predetermined decision region to which the difference parameters are compared (col. 5, lines 51-55). Since the thresholds of Benyassine are predetermined, generating an energy threshold detection value for an individual frame of a

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plurality of frames of an input signal <u>based</u> at least in part <u>on the comparison of an energy value</u> <u>for the individual frame to an energy value of a corresponding previous frame, a noise</u> <u>component of the individual frame, and occurrence of energy dropout in a corresponding</u> <u>preceding frame</u> cannot be said to "necessarily follow" from that which is disclosed by Benyassine. Not only does Benyassine fail to teach it inherently, Benyassine teaches <u>predetermined</u> thresholds.

In addition, Applicant respectfully maintains that Benyassine, alone or in combination with Lee fails to teach or suggest

> means for <u>detecting</u> at least a first tone in the input
> signal including a plurality of tones, the <u>first tone</u>
> <u>having a predetermined frequency and predetermined</u>
> <u>duration, based at least in part on the energy</u>
> <u>threshold detection value</u>,

as required by claim 31. The Office Action apparently relies on the voice activity detection process taught at col. 3, line 7 - col. 7, line 15. This portion of Benyassine teaches a method for "generating frame voicing decisions for an incoming speech signal having periods of active voice and non-active voice for a speech encoder in a speech communications system" (see col. 2, lines 23-26). The method of Benyassine defines a four-dimensional Euclidean space and determines whether the four difference parameters, computed for each frame, define a point <u>within an active voice region</u> of the Euclidean space (col. 5, line 48- col. 6, line 20). Since Benyassine teaches <u>detecting voice, not tones having known frequencies and durations</u>, the Office Action relies on Lee to supply this teaching.

Lee teaches that the DTMF encoding technique uses four low band frequencies and four high band frequencies (col. 1, lines 17-22). At col. 4, lines 54-66, Lee teaches applying three criteria for validating a received sample as a DTMF tone:

7. <u>Accept only signals with exactly two of the expected 8 frequencies</u>, one in each
    group. Both tone signals must be nearly the same in amplitude and within the range of
    the expected signal strength.
8. <u>Reject signals</u> which are accompanied by significant energy <u>at frequencies other than</u>
    <u>the predetermined DTMF frequencies</u>.

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9. <u>Accept only signals that satisfy the specification minimum timing requirements</u> such as minimum tone duration and minimum interdigit pauses

(emphasis added). Lee detects DTMF signals using a combination of frequency domain analysis and time domain analysis and <u>rejects all signals other than</u> those signals with <u>DTMF frequencies</u> satisfying particular timing requirements.

Assuming arguendo that the difference parameters of Benyassine are similar to the energy threshold detection value recited in claim 31, there is no teaching or suggestion to modify the difference parameters of Benyassine to perform the DTMF detection of Lee. The Office Action fails to point out how to modify the difference parameters of Benyassine to reject signals at frequencies other than DTMF frequencies. The difference parameters of Benyassine are computed in the <u>time domain</u>, whereas Lee requires determining two of the three above criteria in the <u>frequency domain</u>. The Office Action and the references fail to teach or suggest how to map Benyassine's parameters into the frequency domain, or otherwise combine the voice activity detection system of Benyassine with the DTMF detection system of Lee to teach the limitations of claim 31.

The Office Action states that Lee is relied on for the multiple frequency detection and that this portion of Lee is being "incorporated as a whole into the Benyassine reference." The Office Action states further that Benyassine is relied upon for the concept of using spectral energy information and Lee is relied upon for the detailed calculation using energy information. However, incorporating the DTMF detection of Lee into the voice activity detection system of Benyassine renders the system of Benyassine unsatisfactory for its intended purpose. See MPEP § 2143.01. For example, Lee teaches a system that avoids "false validation of tone signals resulting from the occurrence of coincidental speech or other signals at the DTMF frequencies" (col. 4, lines 23-26). The system of Lee rejects signals that include significant energy at frequencies other than the predetermined DTMF frequencies (col. 4, lines 61-63). The difference parameters of Benyassine are used to detect speech by determining if, for each frame, a vector defined by these parameters lies within an <u>active-voice region</u>. Modification of Benyassine to reject signals that include significant energy at frequencies other than the predetermined DTMF frequencies, as required by Lee, requires Benyassine to reject voice band signals that include significant energy at frequencies other than the predetermined DTMF frequencies. Such a

combination renders Benyassine unsatisfactory for its intended purpose of detecting voice activity in general. Therefore, there is no suggestion or motivation to make the proposed modification and the teachings of Benayssine and Lee are not sufficient to render claim 31 *prima facie* obvious. Accordingly, Applicant respectfully requests that the rejection of claim 31 and all claims dependent thereon be withdrawn.

Summary

In summary, claims 1-31 are in the case. All claims are believed to be allowable over the art of record, and a Notice of Allowance to that effect is respectfully solicited. Nonetheless, if any issues remain that could be more efficiently handled by telephone, the Examiner is requested to call the undersigned at the number listed below.

Respectfully submitted,

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